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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,567	08/29/2005	Gerhard Wotting	PO-8454/CF1-10	1372

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EXAMINER	
KEMMERLE III, RUSSELL J	
ART UNIT	PAPER NUMBER
1731	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/523,567	WOTTING ET AL.	
	Examiner	Art Unit	
	Russell J. Kemmerle	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) *1-7 and 12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02 February 2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II, claims 8-11 in the reply filed on 08 February 2007 is acknowledged. The traversal is on the ground(s) that the claims of groups I and II would be part of an overlapping search area and would thus not place a serious burden on the examiner. This is not found persuasive because each group would involve an extensive search in an area not required in a search for the other group, thus, seriously burdening the examiner.

The requirement is still deemed proper and is therefore made FINAL.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Germany on 06 August 2002. It is noted, however, that applicant has not filed a certified copy of the 102 35 965.2 application as required by 35 U.S.C. 119(b).

Information Disclosure Statement

The information disclosure statement filed 02 February 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein regarding the German patent and the two Japanese patent abstracts has not been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Nomura (US Patent 6,314,798).

Nomura discloses a method of making cutting tools and wear-resistant materials (such as ball bearings) of silicon nitride (Si_3N_4) sintered bodies (Col 1 lines 11-14).

The method taught by Nomura is exemplified in the method of example I (Col 5 line 35-Col 6 line 40). It involves mixing a Si_3N_4 powder with various amounts (between 0-6wt%) of MgO, Al_2O_3, Y_2O_3, Yb_2O_3, Ce_2O_3 and ZrO_2 powder. The powder added to the Si_3N_4 powder acts as a sintering aid (Col 5 lines 61-67).

This powder is then wet ball milled in ethanol to form a slurry (Col 6 lines 14-17). The slurry is then passed through a 325-mesh sieve (removing particles greater than about 45 μm), and then an organic binder is added to the slurry. The slurry is the then spray-dried to form a dry granulated powder (Col 6 lines 19-22).

This powder is then heated at three different stages. First it is heated at 873K (600°C) for 1 hour in a N_2 atmosphere of 1 atm (approximately 1 bar) (Col 6 lines 23-28). Second, it is heated to 1973-2023K (1700-1750°C) for 4 hours in a N_2 atmosphere of 100-300 kPa (approximately 1-3 bar) (Col 6 lines 30-34). Finally, it is heated at 1973-

2023K (1700-1750°C) for 2 hours in a N_2 atmosphere of 10-100 MPa (approximately 100-1000 bar) (Col 6 lines 34-39).

While Nomura generally discusses the use of the invention as related to Si_3N_4 powders, it also specifically states that it could be used with other ceramic materials, such as Zirconia based ceramics (Col 10, lines 55-64).

While Nomura does not specifically disclose that the final ceramic material would be free of at least one of macroscopic defects larger than 20μm and optical heterogeneities larger than 50μm, Nomura teaches substantially the same process using substantially the same materials as the current disclosure, and thus would inherently create a final ceramic material that was free of such defects.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura in view of Yeckley (US Patent 5,508,241).

Nomura is relied upon as discussed above, but fails to teach that the slurry is passed over a magnetic separator, contains an organic additive consisting of polyacrylates, polyvinyl alcohol, polyglycols or polyvinylpyrrolidone, and is dried at a temperature below 200°C (or 250°C for claim 11).

Yeckley discloses a method of forming a sintered Si_3N_4 article by heating a powder at an elevated pressure. The method involves mixing a Si_3N_4 powder and other additives in a solvent to form a slurry, which is then passed through a filter and a magnetic separator to remove undesired particles. An organic binder, specifically polyvinylpyrrolidone (PVP), is then added to the slurry, which is then spray dried to form a granulated powder, which can be used to form a ceramic article to be sintered (example I, Col 2 line 45-Col 3 line 4).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to have modified the method of forming a Si_3N_4 article as taught by Nomura by passing the slurry through a magnetic separator to remove magnetic impurities and using PVP as the organic binder. The motivation to add the magnetic separator purification step would have come from a desire to remove magnetic impurities (particularly iron) which can reduce the quality of Si_3N_4 articles (see Pujari, US Patent 5,759,481, Col 4 lines 53-65). The motivation to use PVP as the binder would come from Nomura's disclosure that an organic binder should be added, and Yeckley's teaching that PVP is an effective organic binder for use with Si_3N_4.

While neither Nomura or Yeckley both disclose drying the slurry (specifically spray drying), neither specifically discusses at what temperature the drying operation should be carried out at. However, since both use solvents having a relatively low boiling point (Nomura uses ethanol having a boiling point of about 78°C and Yeckley uses isopropyl alcohol having a boiling point of about 82°C), it would be obvious to one of ordinary skill in the art that drying could be done at any temperature above those boiling points, since that would be sufficient to drive off the liquid. Therefore it would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, that the drying step taught by both Nomura and Yeckley be carried out at less than 200°C since temperature much lower than that would be sufficient to dry the slurry, and heating past what would be needed to dry the slurry would be wasteful and unnecessary.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell J. Kemmerle whose telephone number is 571-272-6509. The examiner can normally be reached on Monday through Friday, 8:30-4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RJK

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